Analysis Tools and Techniques Program

The continuing shrinking of device dimensions and the rapid inclusion of new materials into device fabrication demands the development of new analytical tools and techniques. The need for new analytical techniques and tools has increased as the components in the transistors approach the low nanometer level and the number of transistors per chip approaches 1 billion. The development of tools capable of characterizing the structures produced in the laboratories as well as those needed to confirm the manufacturing process require significant improvements. Those used for production also require significant speeds not to slow down the commercial manufacturing. This latter condition may require some sacrifices in the resolution and accuracy of those tools. In addition, more significant modeling that allows us to bridge those areas where measurements can be done to those where knowledge is needed, but measurements cannot be done is critical. Significant improvements in tools capable of analyzing properties of defect particles in the sub-30 nm size are urgently needed. Global and local stress measurement techniques need to be developed.